

FIG. 1

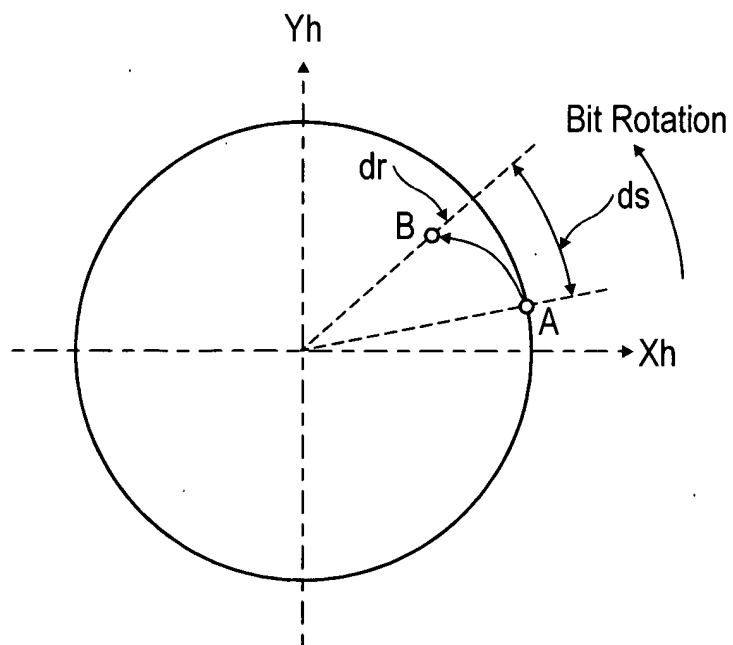


FIG. 2

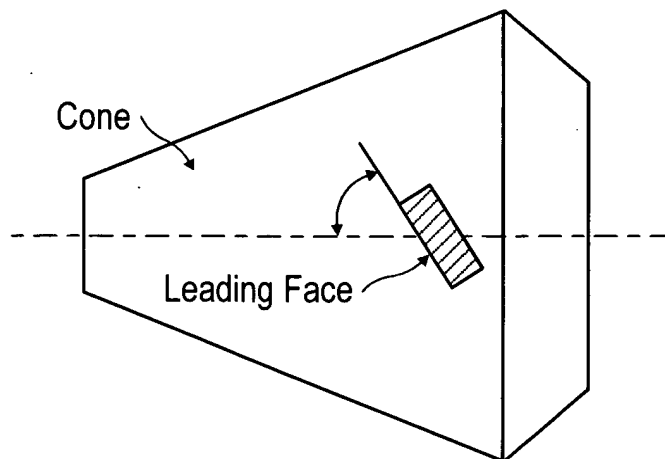


FIG. 5

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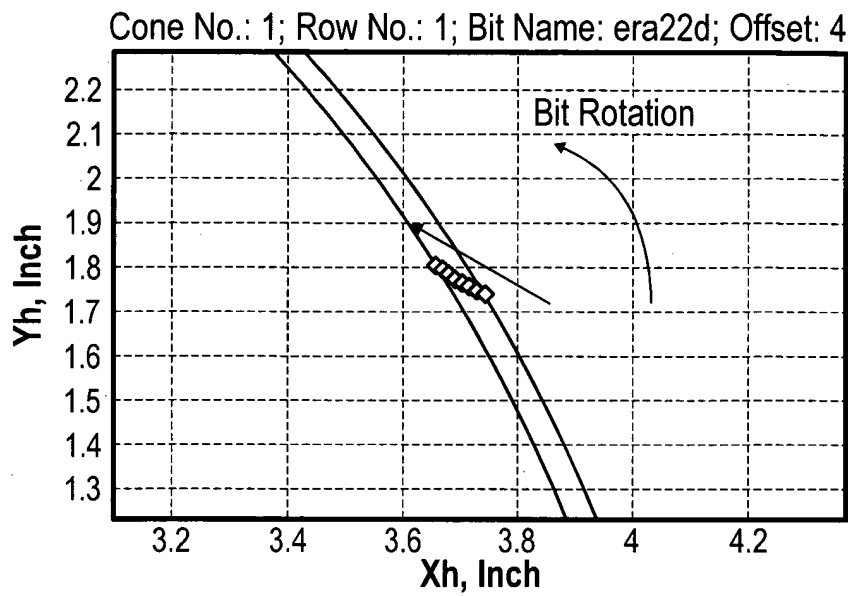


FIG. 3a

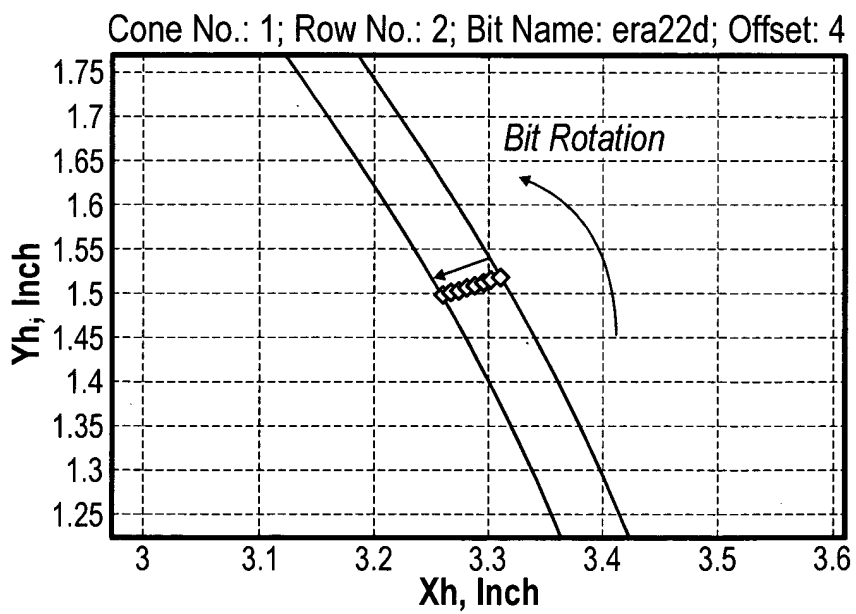


FIG. 3b

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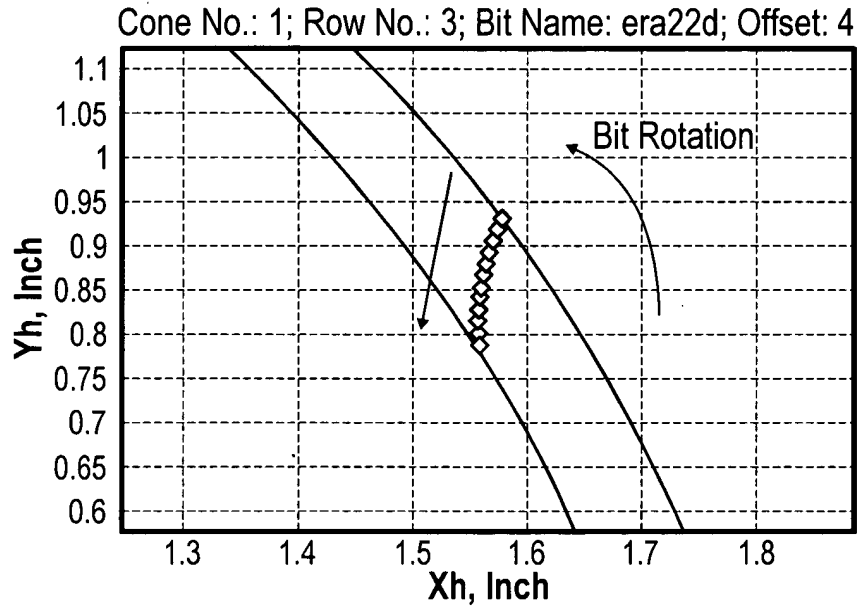


FIG. 3c

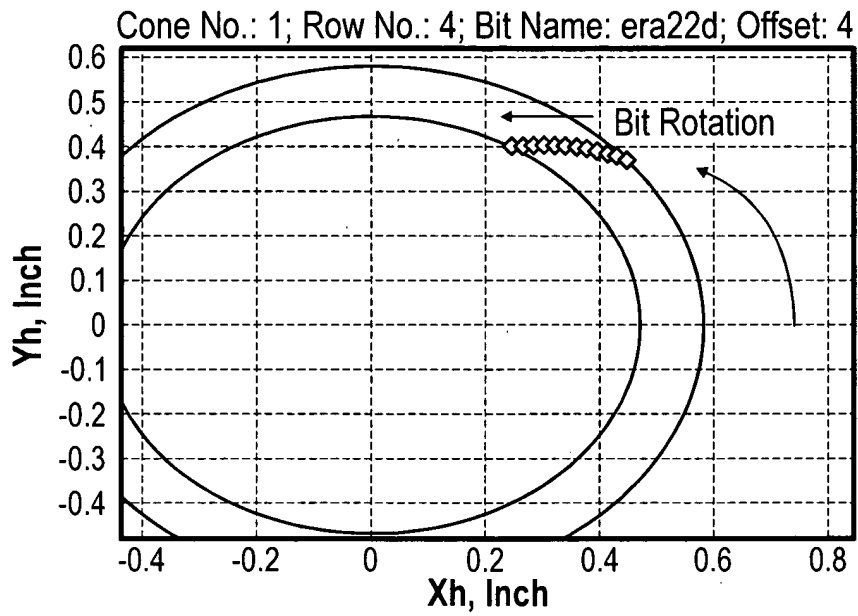


FIG. 3d

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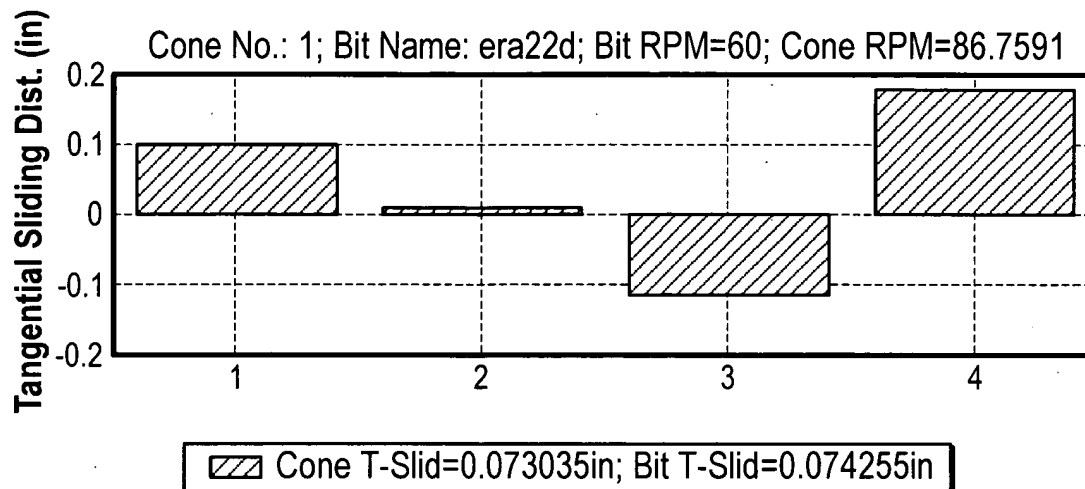


FIG. 4a

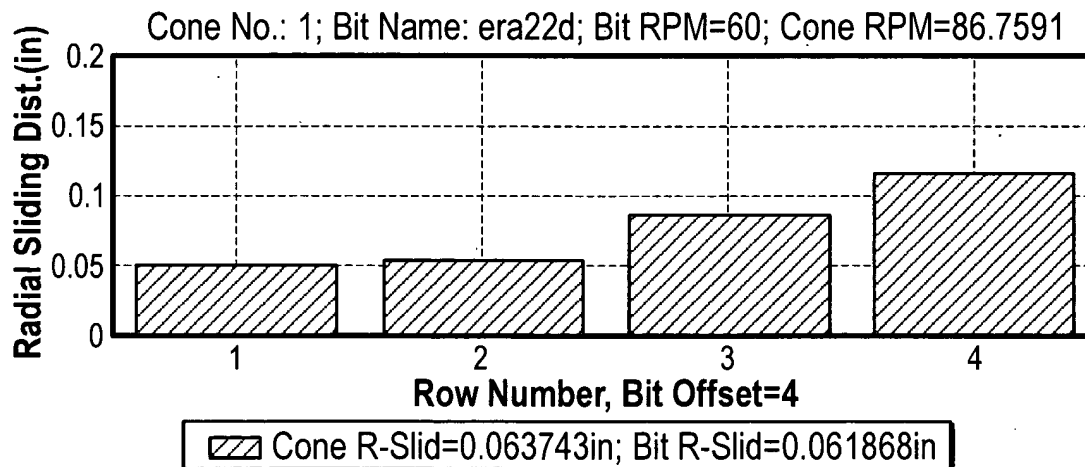


FIG. 4b

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Cone No.: 1; Bit Name: dsgn₂973₁; Bit RPM=60; Cone RPM=98.3511

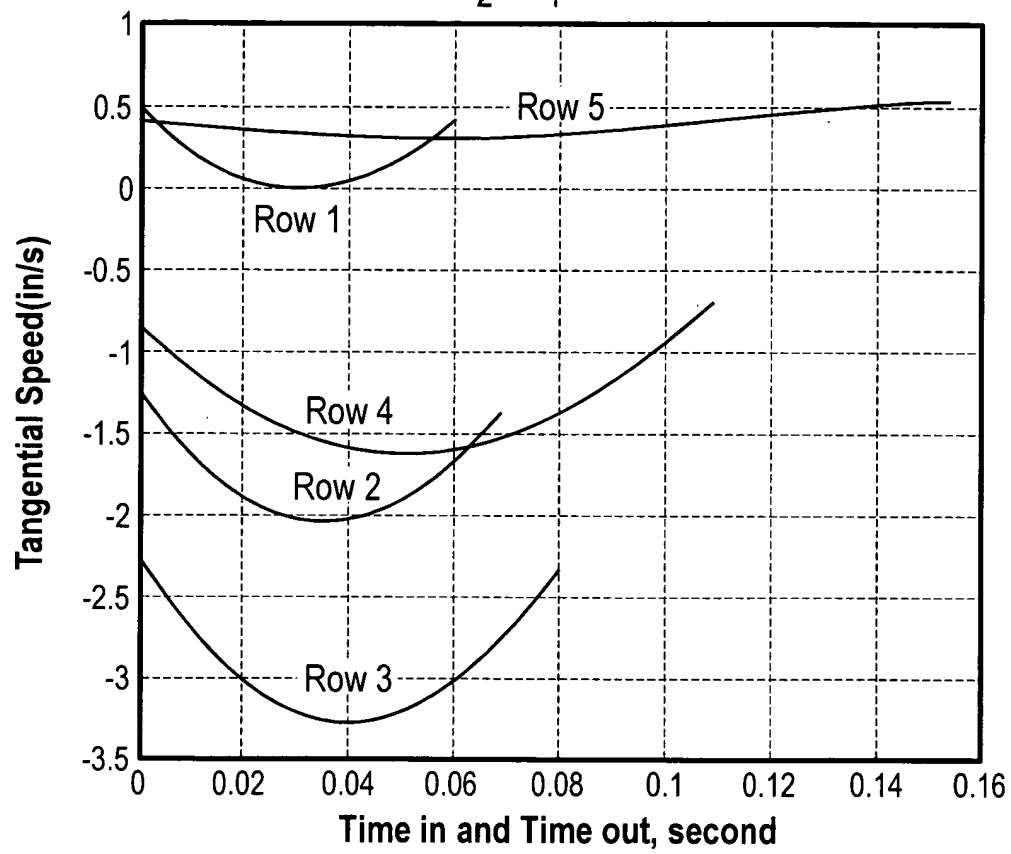


FIG. 6

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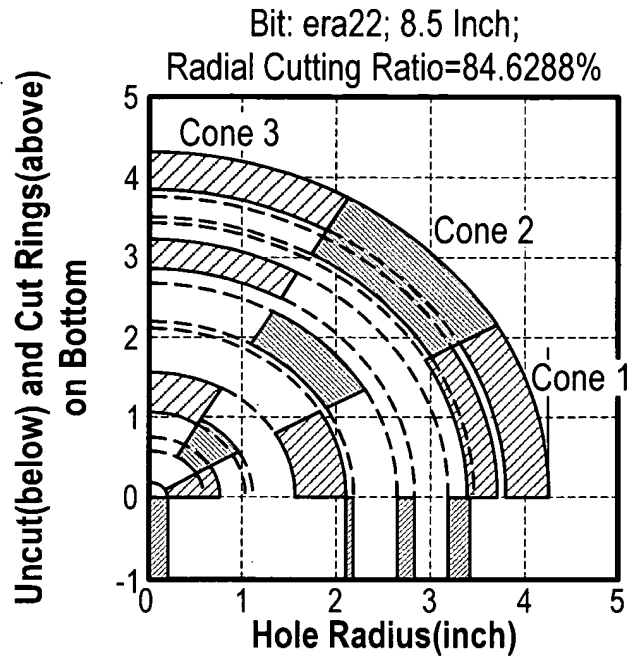


FIG. 7a

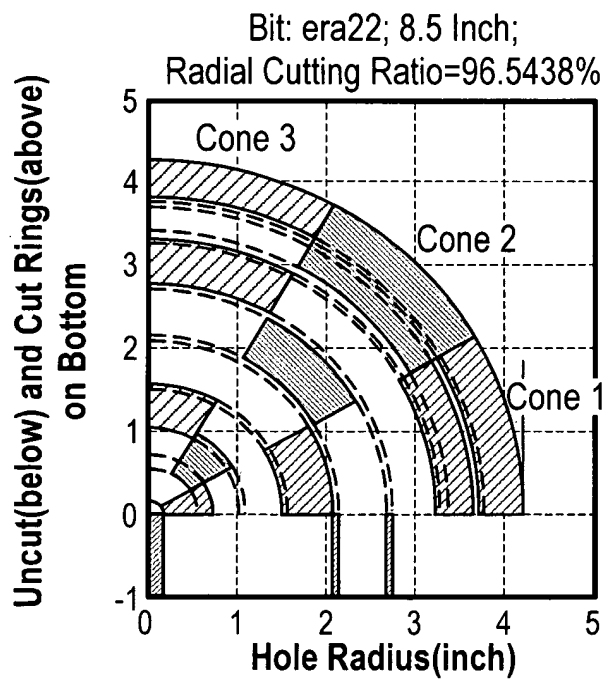


FIG. 7b

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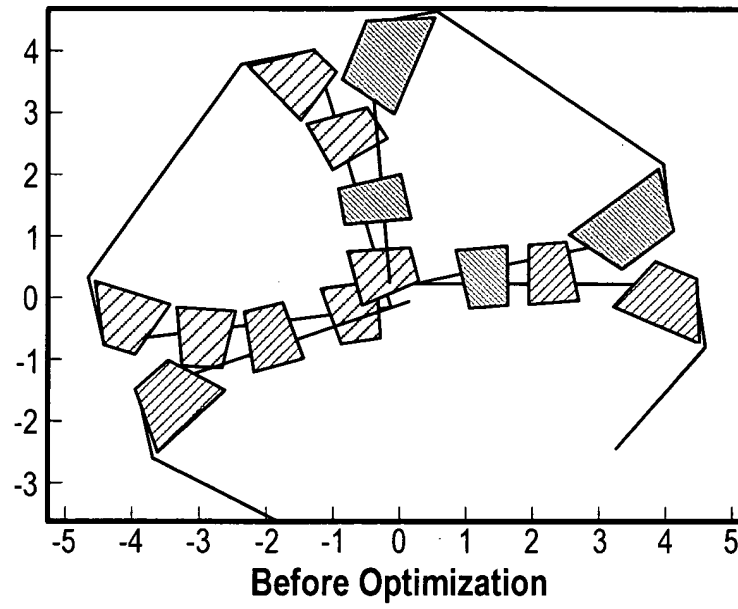


FIG. 8a

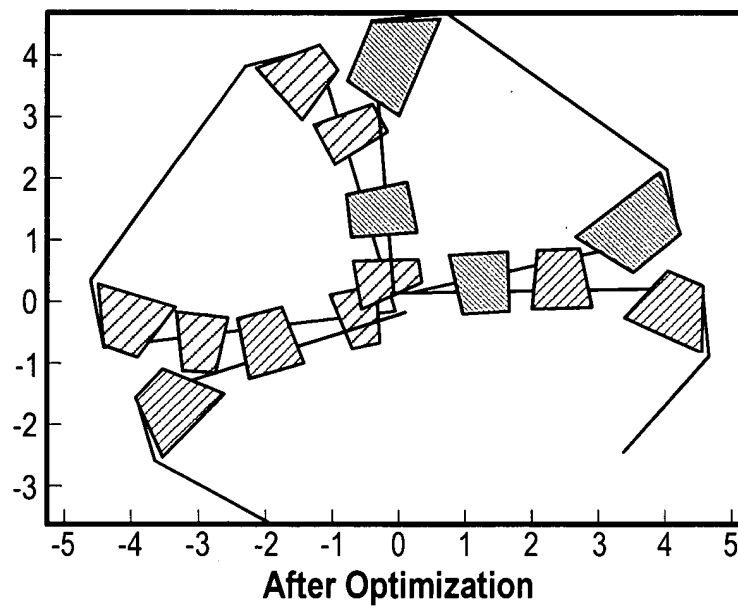


FIG. 8b

ERA22_V Cone No.1

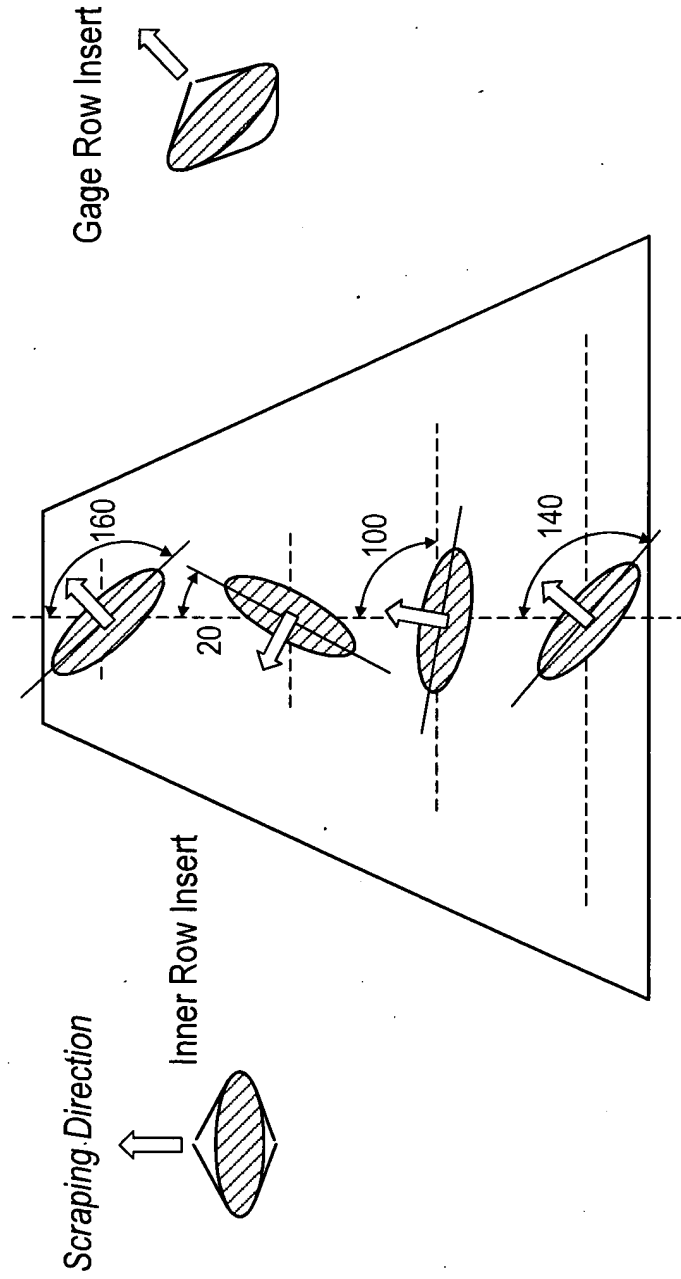


FIG. 9a

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ERA22_V Cone No.2

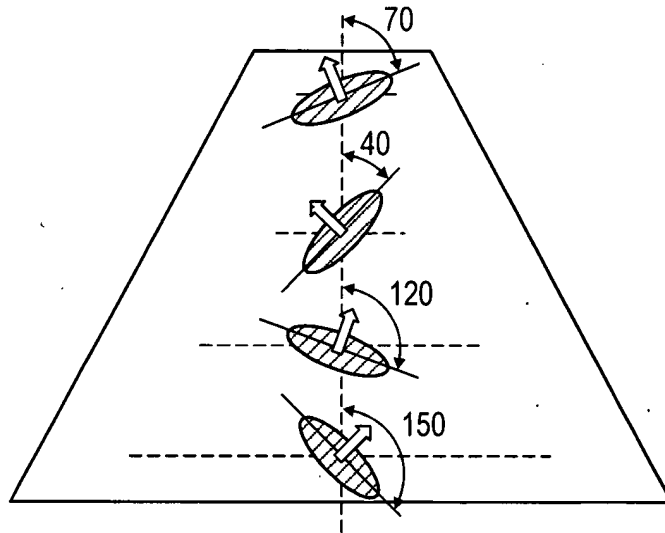


FIG. 9b

ERA22_V Cone No.3

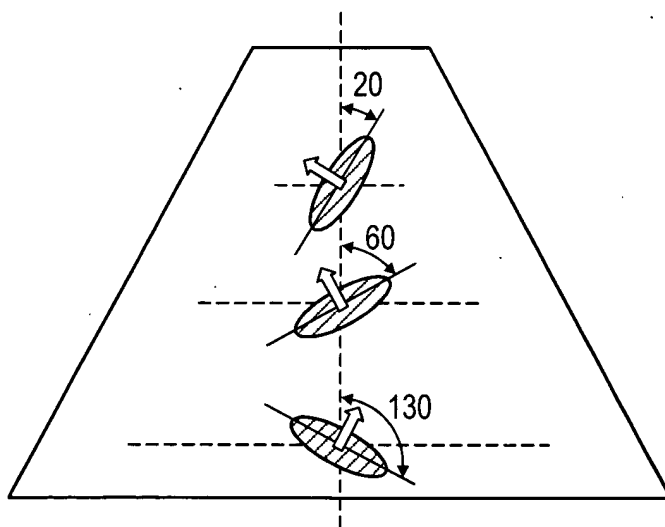


FIG. 9c

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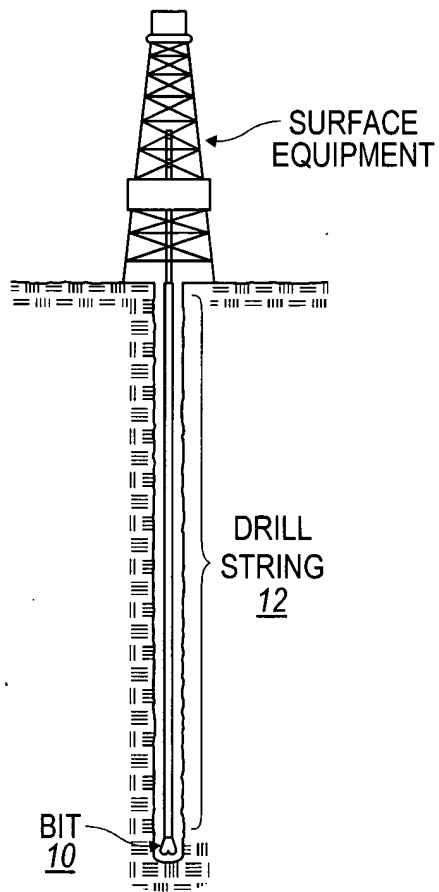


FIG. 10

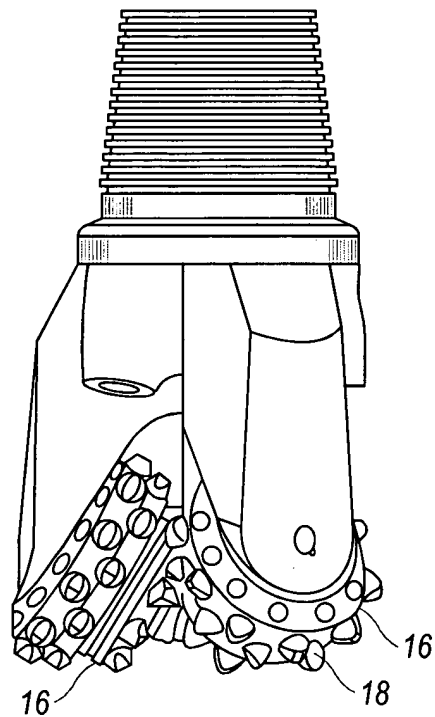
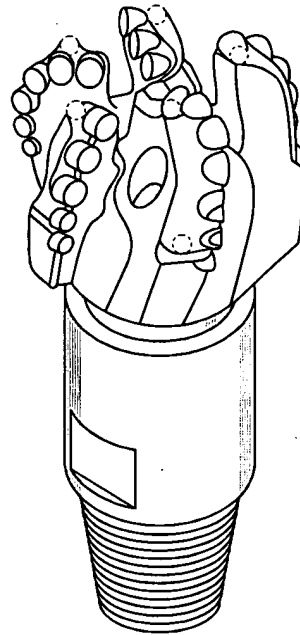


FIG. 12

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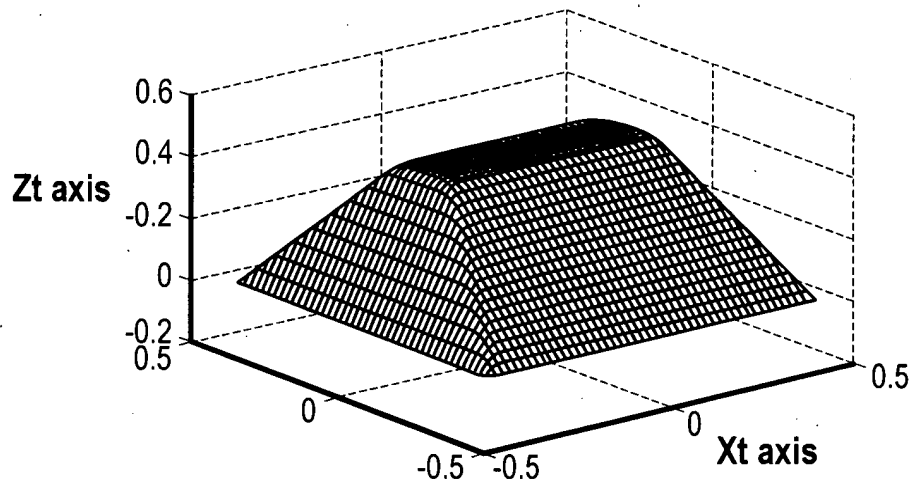


FIG. 13

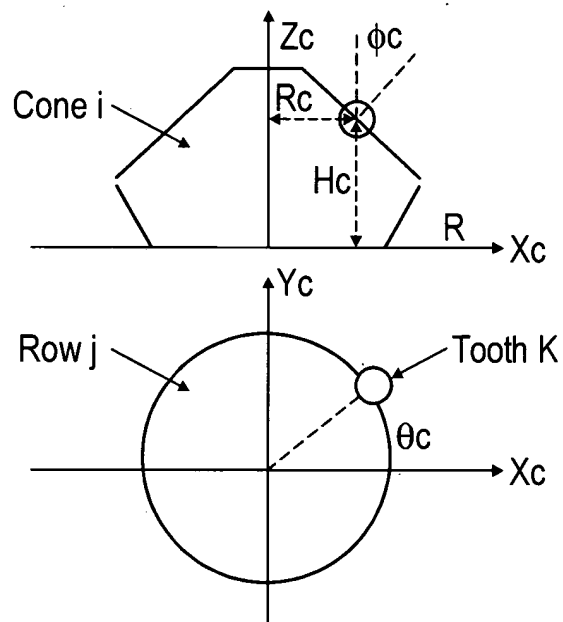


FIG. 14

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Cone No.: 1; Row No.: 2; Bit Name: dsgn₂973₁; Offset: 0

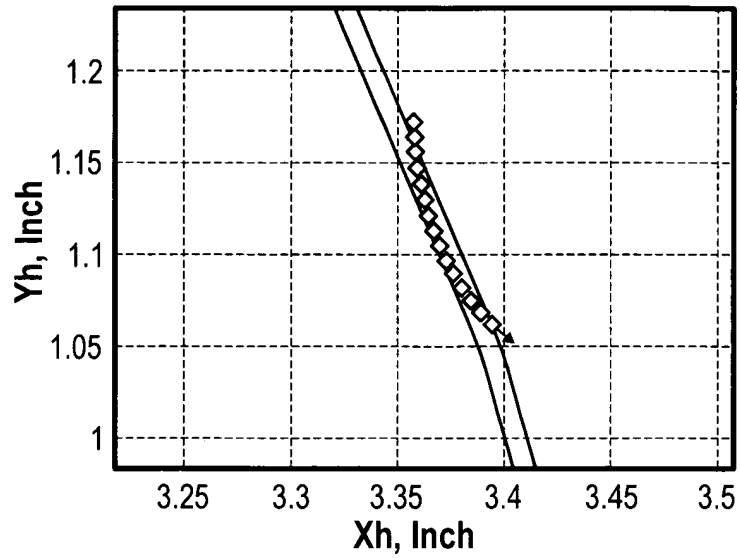


FIG. 15a

Cone No.: 1; Row No.: 2; Bit Name: dsgn₂590₅; Offset: 0

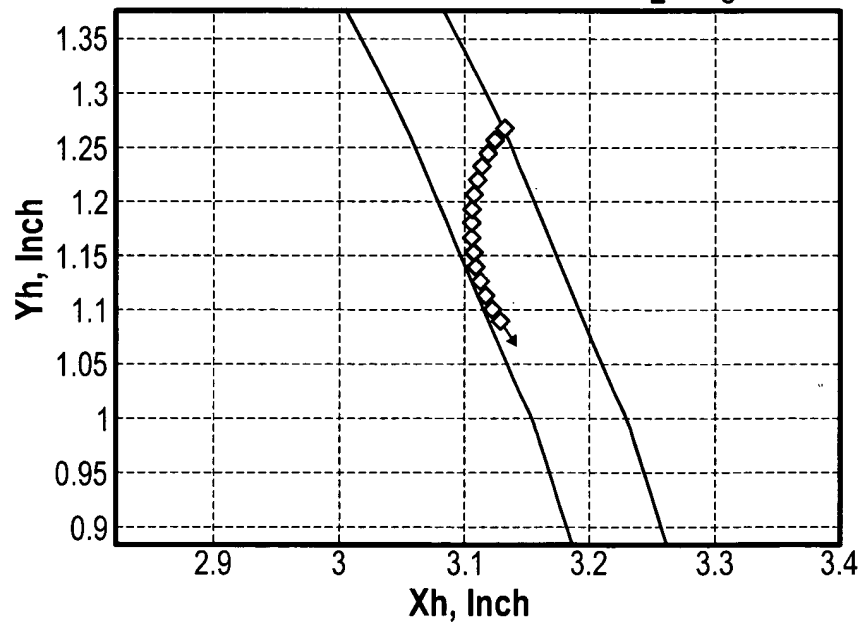


FIG. 15b

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Cone No.: 1; Row No.: 2; Bit Name: dsgn₂782₂; Offset: 4

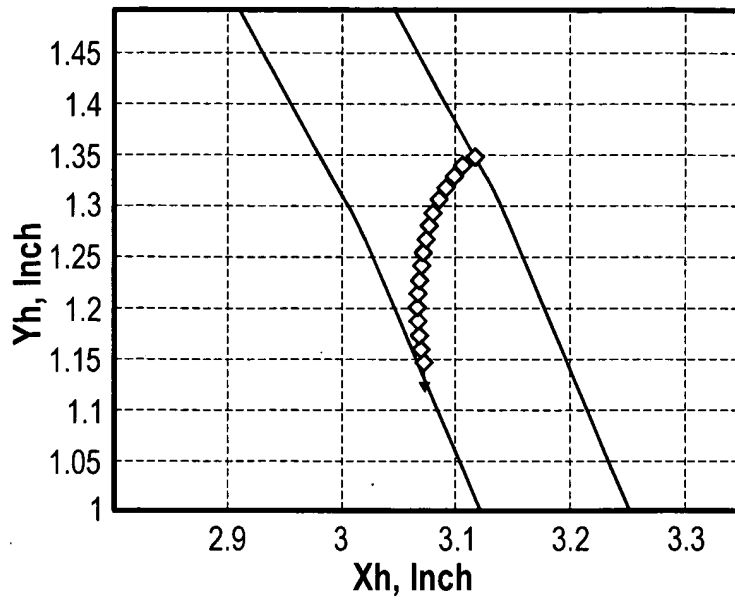


FIG. 15c

Cone No.: 1; Row No.: 2; Bit Name: dsgn₃044₃; Offset: 5

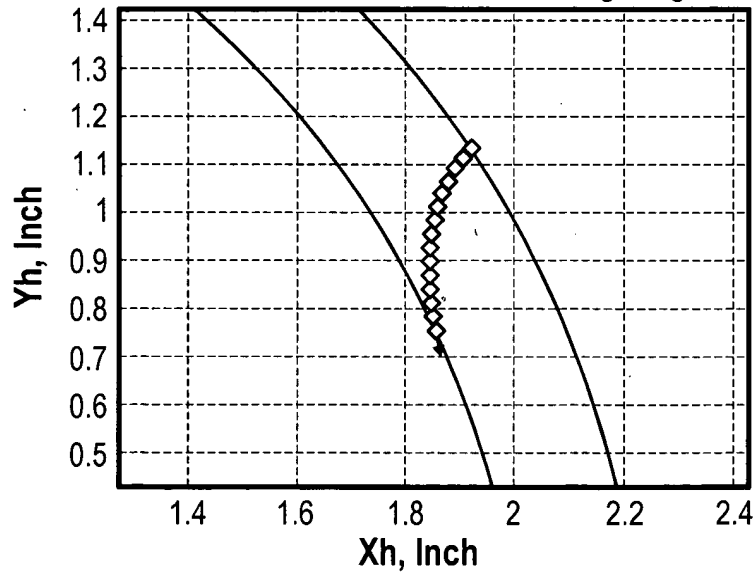


FIG. 15d

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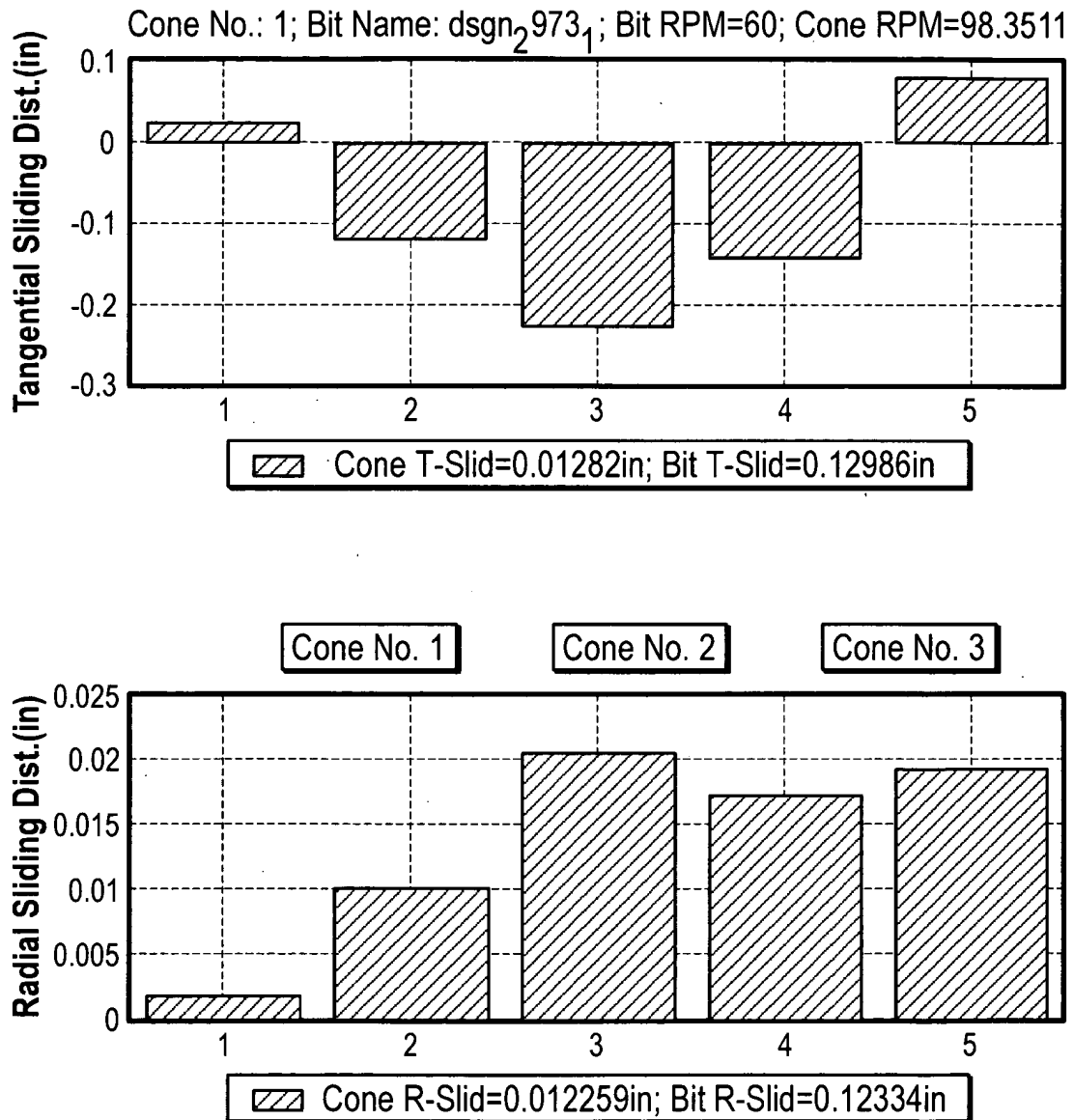


FIG. 16a

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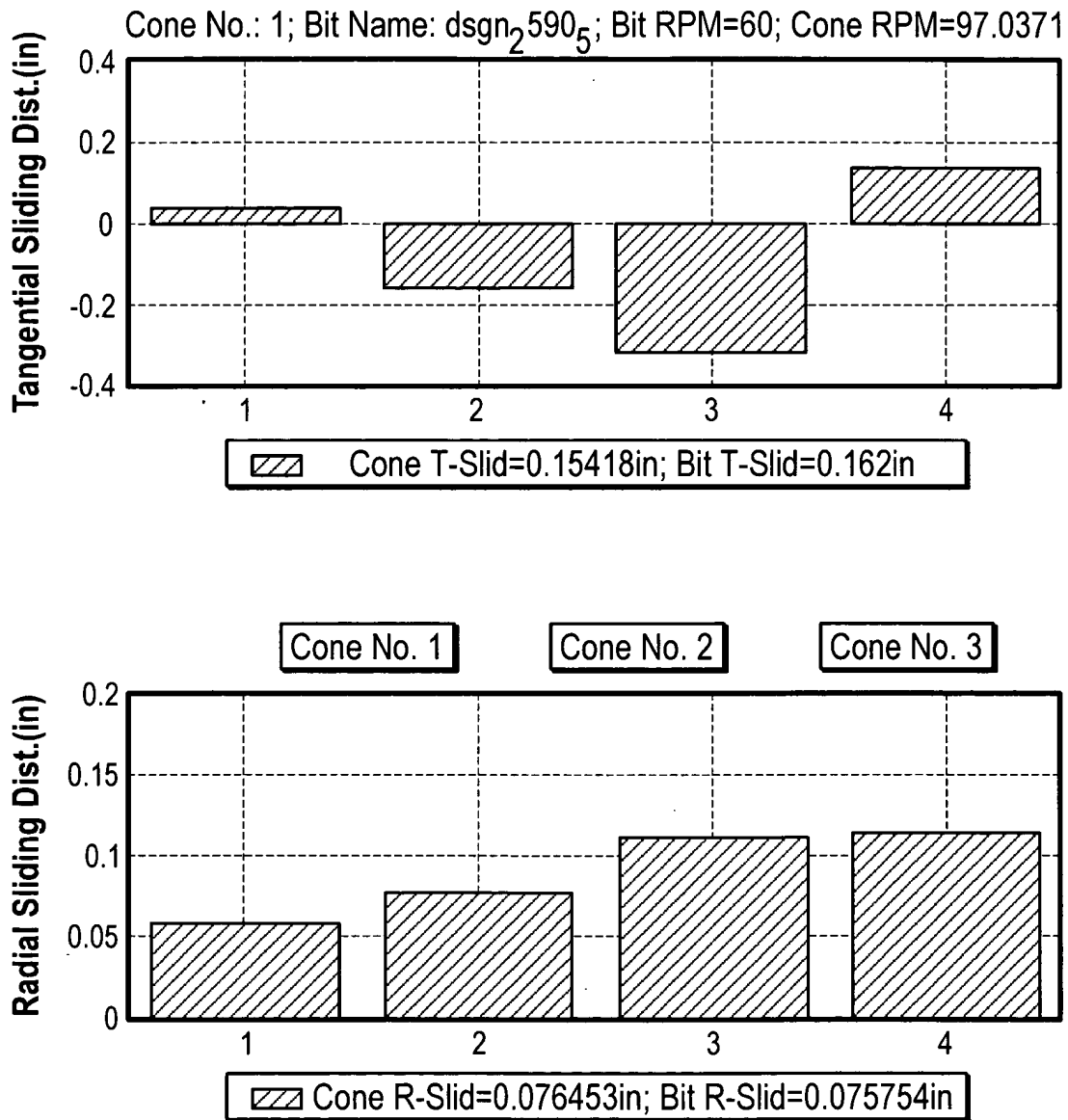


FIG. 16b

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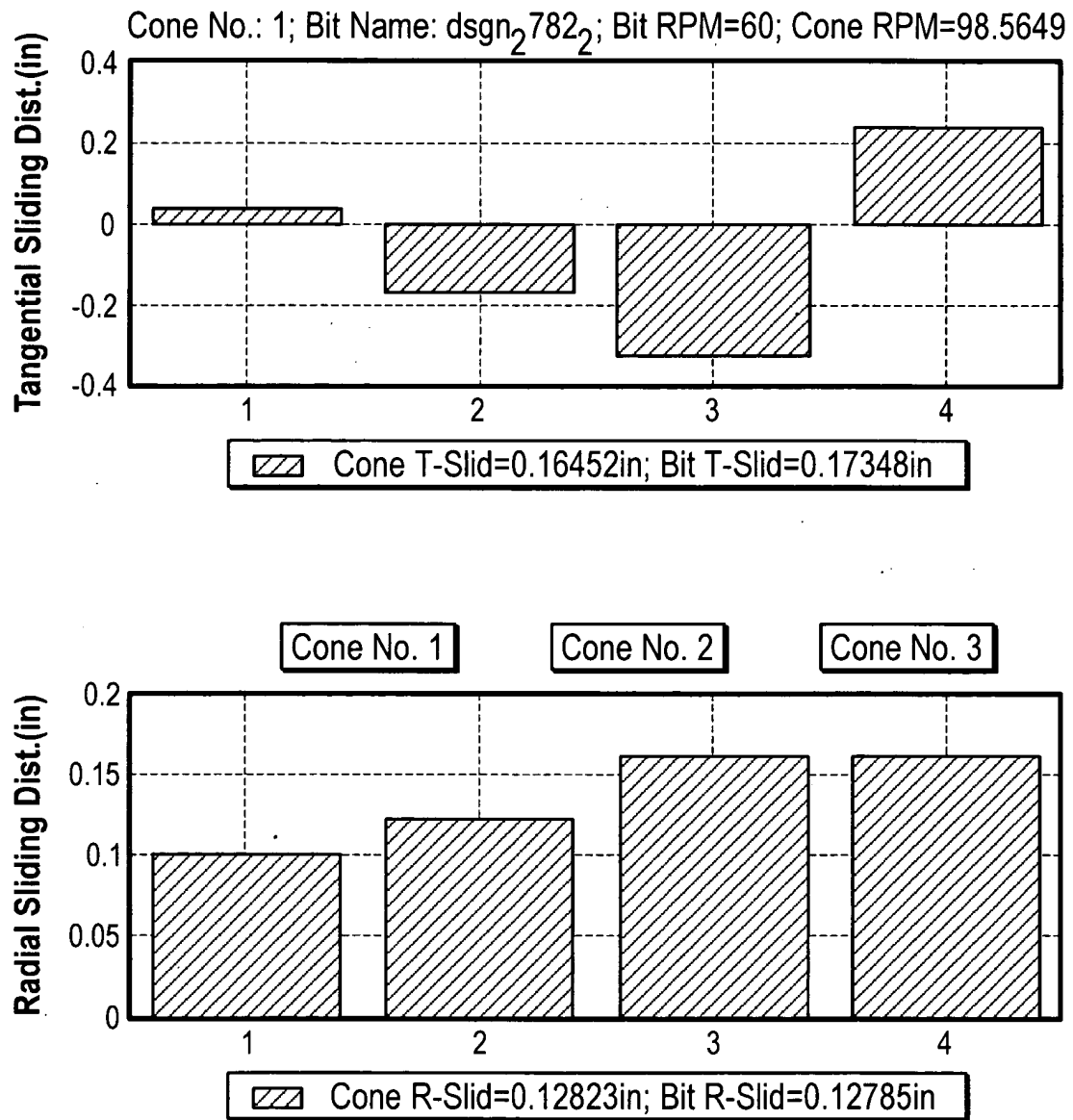


FIG. 16c

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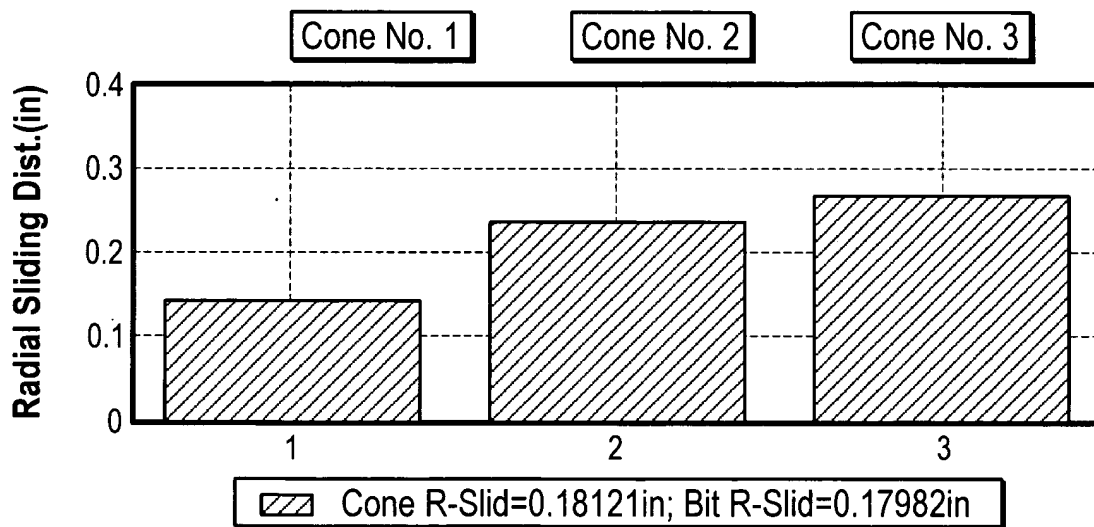
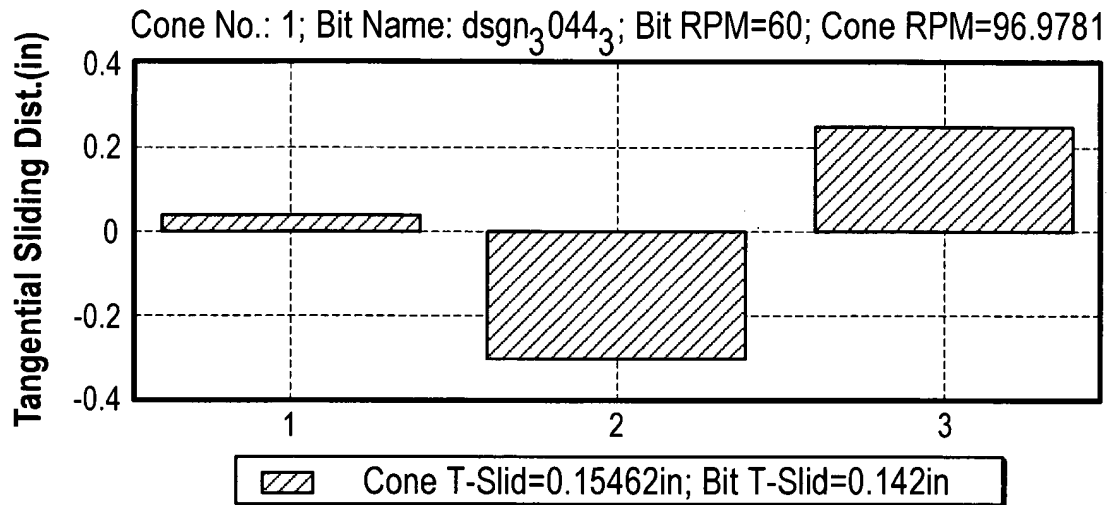


FIG. 16d

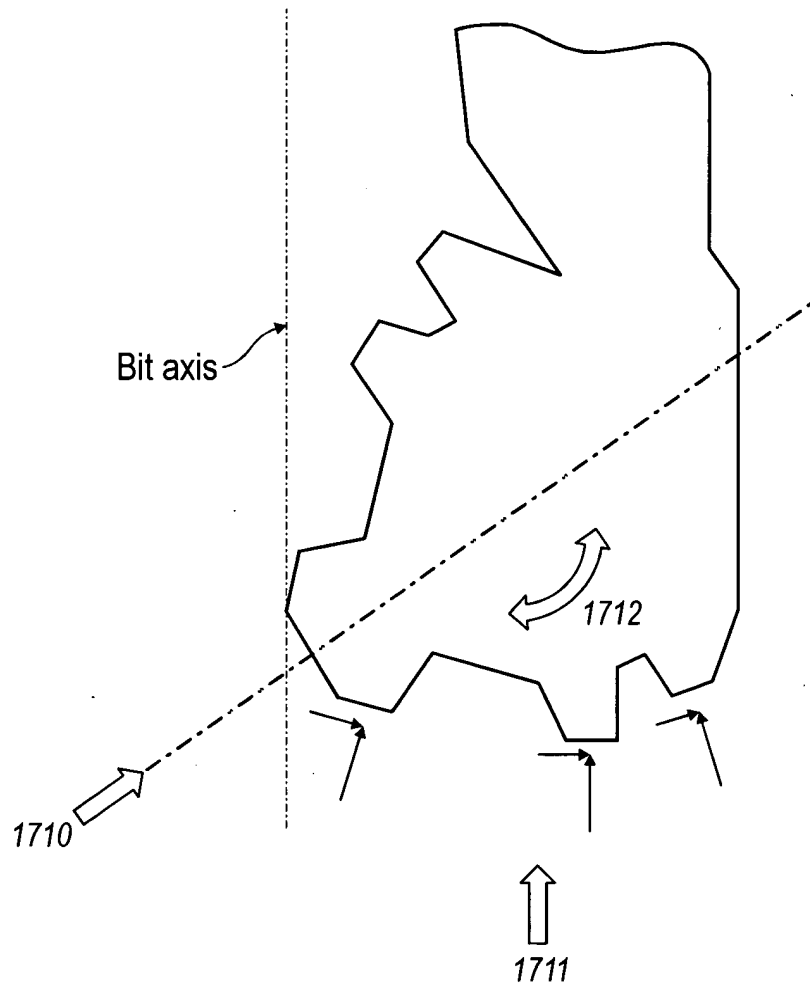


FIG. 17

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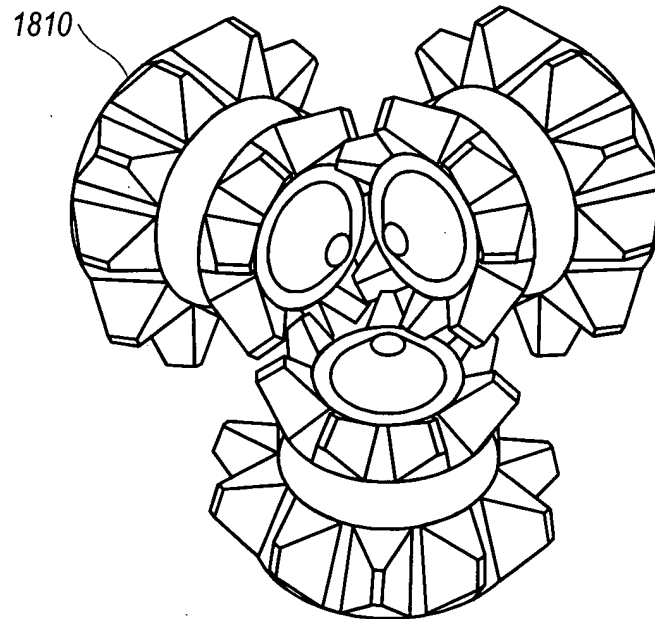


FIG. 18a

Energy Balanced Condition of Roller Cone Bit

	Cone 1	Cone 2	Cone 3	Diff (%)	DsgStd (%)
Rock Volume:	38.092	31.024	30.884	7.2	5
Weight on Cone:	38.344	31.3059	30.3501	7.9	5
Bearing Force:	38.888	27.7698	33.3422	11.1	5
Bearing Moment	38.1579	32.3489	29.4932	8.6	5

FIG. 18b

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The minimal distance between teeth surface is 0.041317 inch

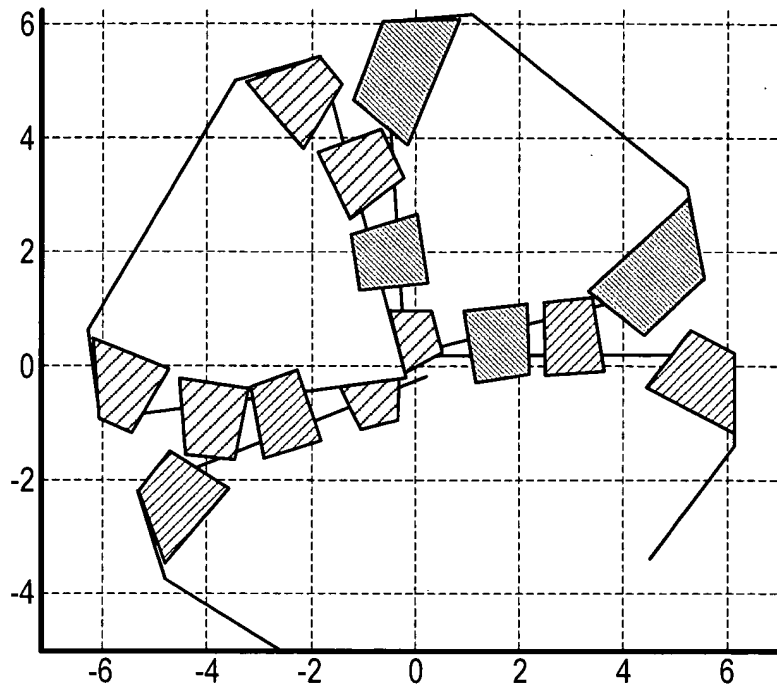
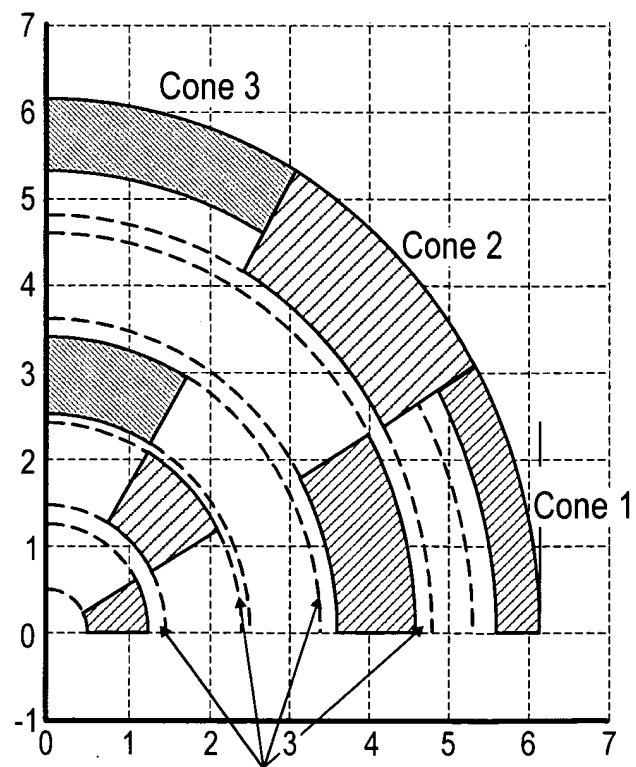


FIG. 19a



Uncut bridges on bottom hole

FIG. 19b

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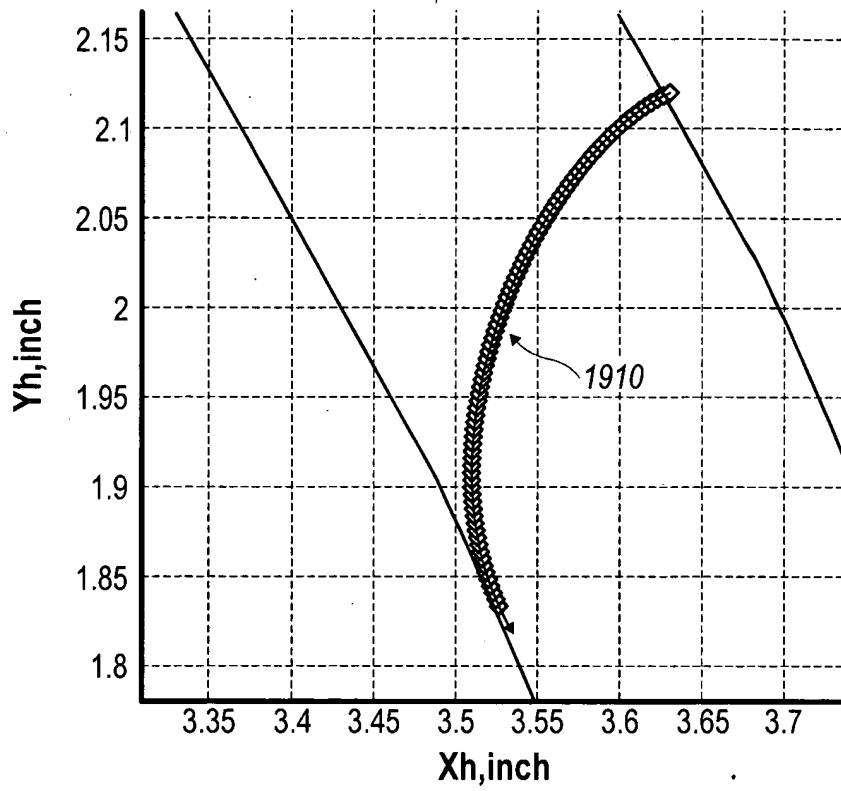


FIG. 19c

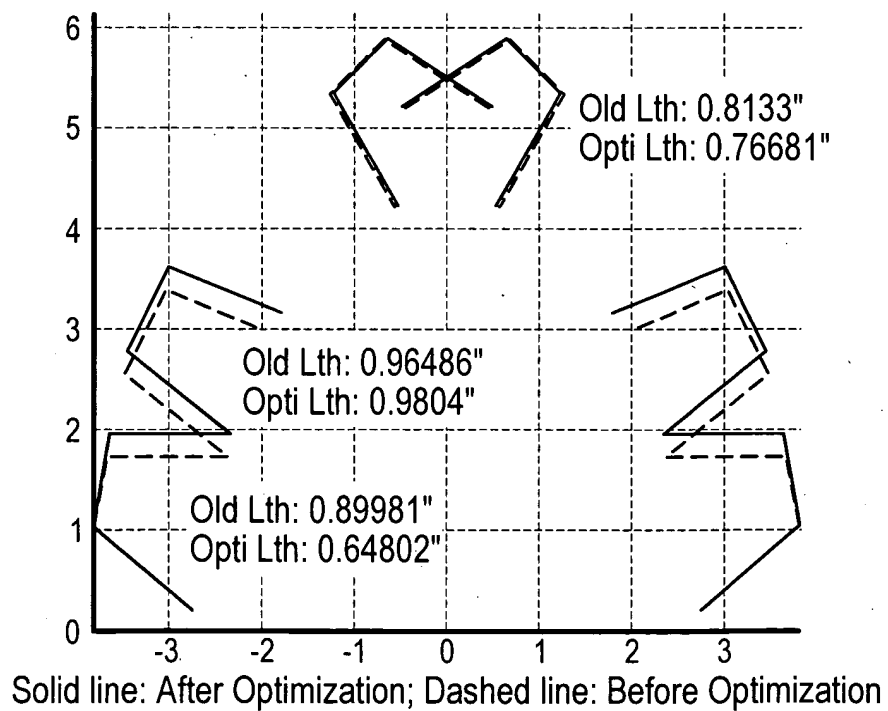


FIG. 20a

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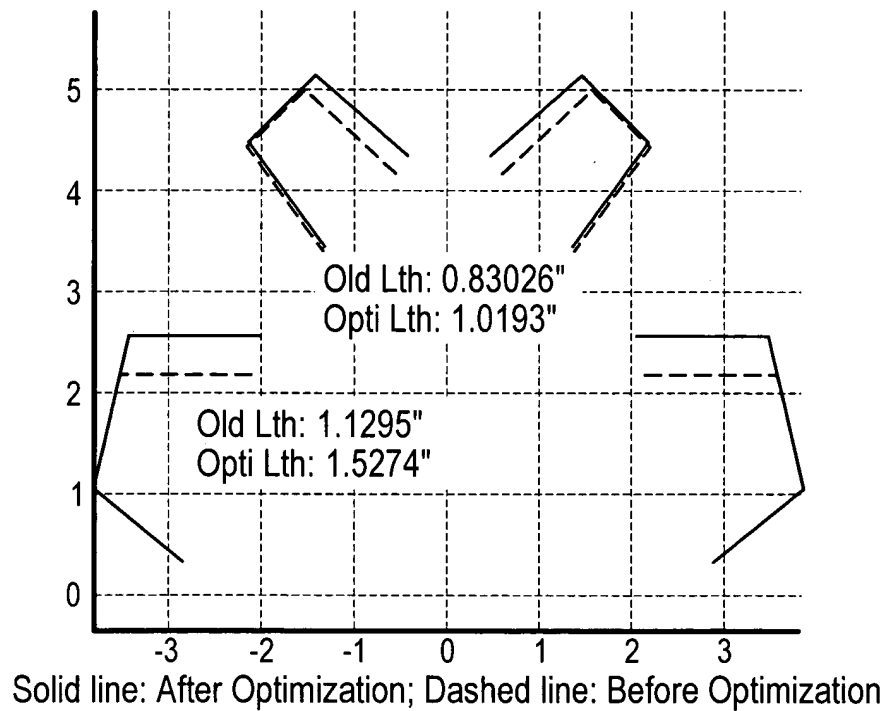


FIG. 20b

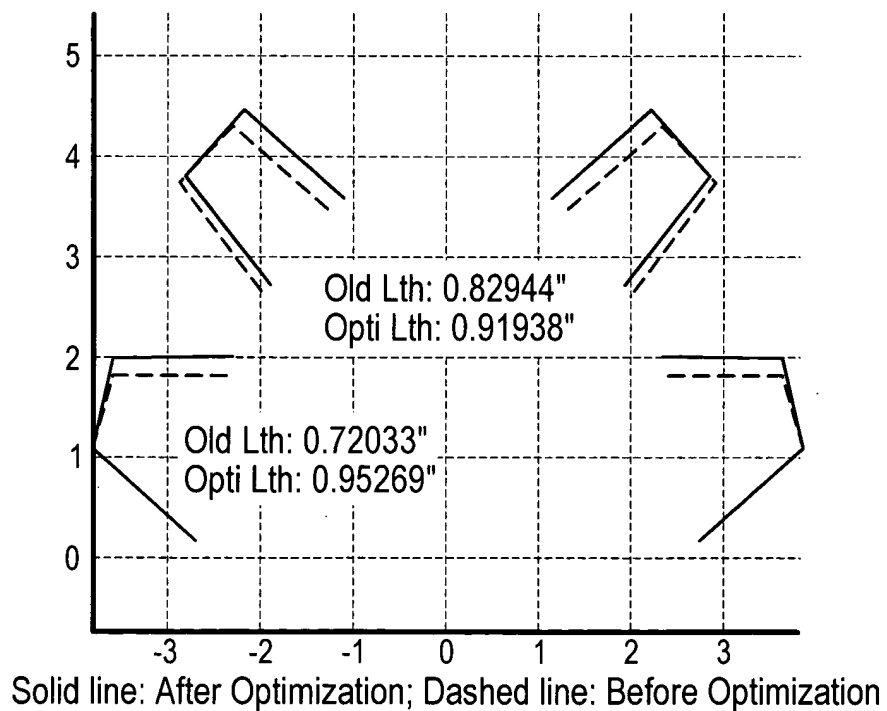


FIG. 20c

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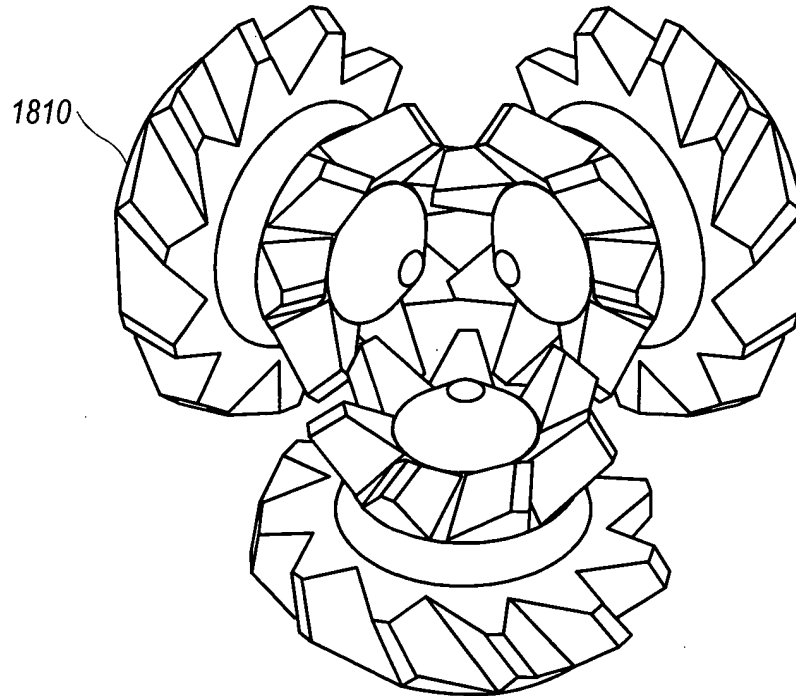


FIG. 21a

Energy Balanced Condition of Roller Cone Bit

	Cone 1	Cone 2	Cone 3	Diff (%)	DsgStd (%)
<hr/>					
Rock Volume:	33.0838	34.2063	32.7099	1.4	5
Weight on Cone:	32.784	34.4663	32.7497	1.7	5
Bearing Force:	35.5153	30.4993	33.9854	5	5
Bearing Moment	30.7544	35.6482	33.5974	4.8	5

FIG. 21b

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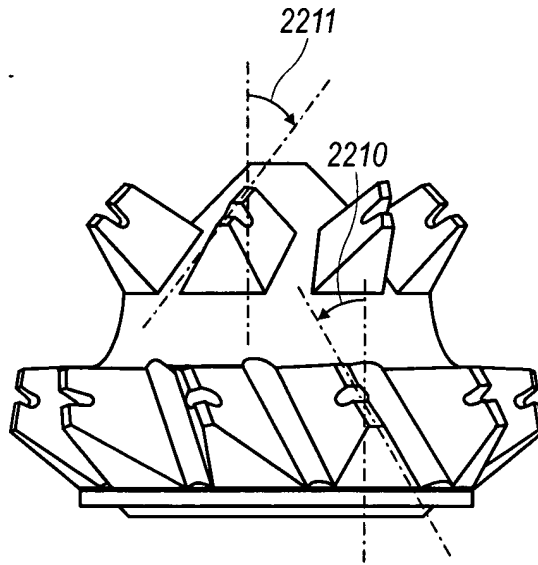


FIG. 22a

Row No.	No. 1	No. 2	No. 3
Cone 1	16	-25	0
Cone 2	32	-38	0
Cone 3	36	-34	0

FIG. 22b

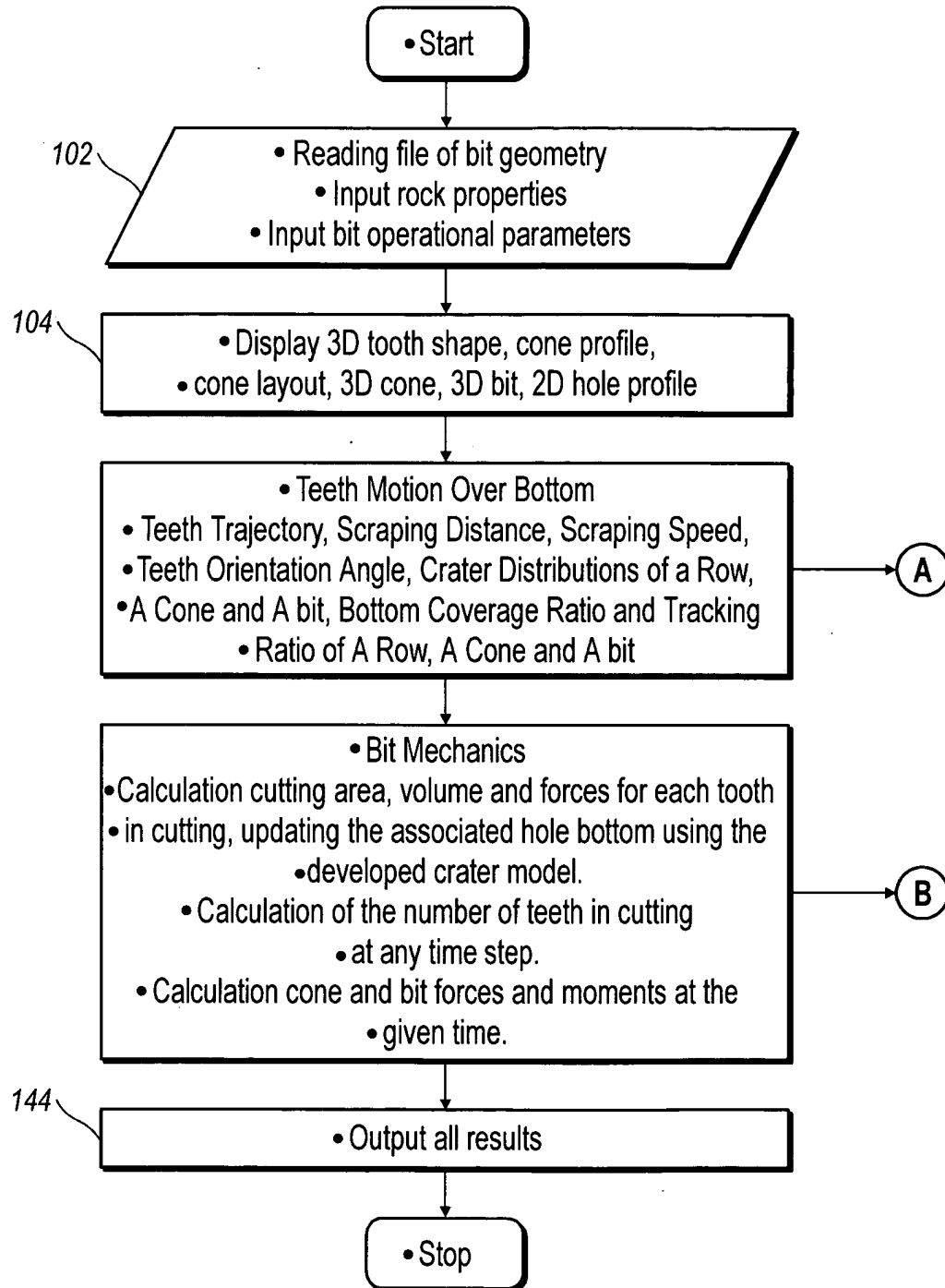


FIG. 23a

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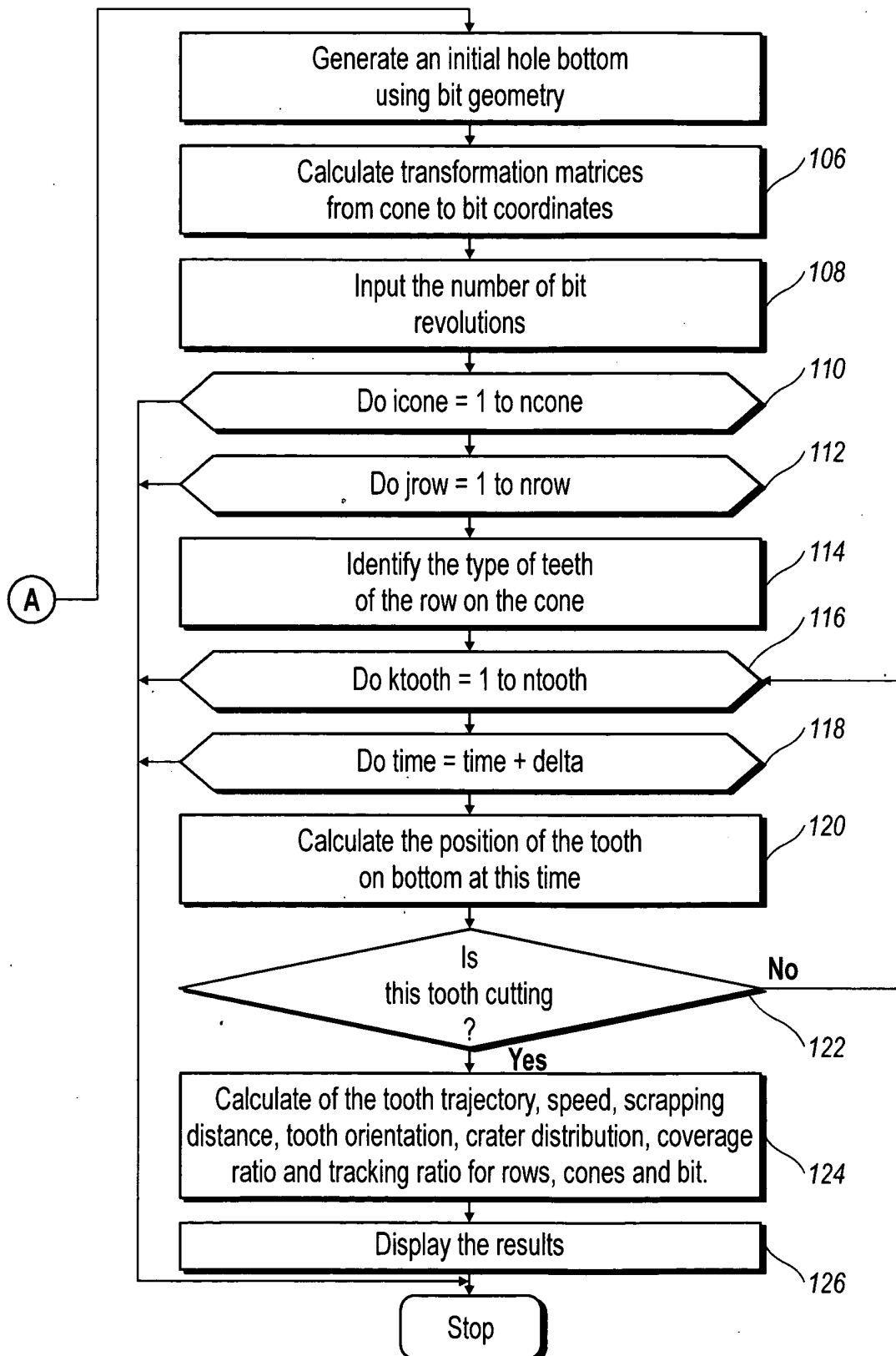


FIG. 23b

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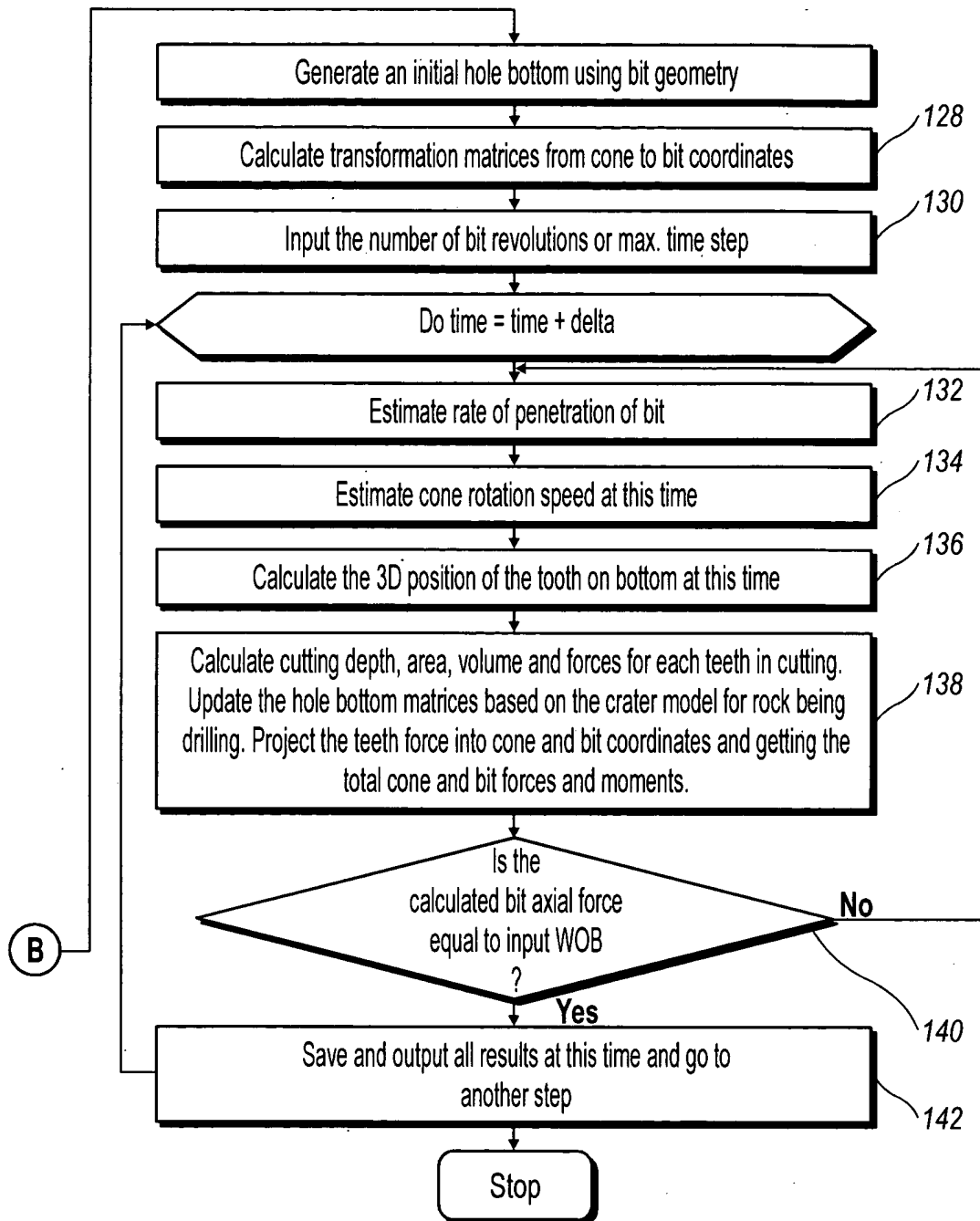


FIG. 23c